

# RF/Microwave Products

High  
Accuracy  
Attenuators



## Honeywell As Your RFIC Partner

Honeywell's family of digital attenuators offers an effective solution for your RFIC needs. We fuse our proven reliability with innovative technology solutions to offer the value, quality and service you need in today's fast-paced data communications marketplace.

By partnering with Honeywell, you're teaming up with a pioneer of Silicon On Insulator (SOI) CMOS technology and over 24 years experience in SOI IC design, development and manufacturing.

With SOI CMOS technology, our designs integrate CMOS control logic and ESD protection, operate from a single positive supply voltage, and have exceptionally high channel-to-channel isolation. In addition, SOI CMOS technology provides the performance of GaAs with the economy of conventional bulk CMOS.

## Attenuators With World-Class Step Accuracy

The Honeywell family of digital attenuators is designed for wireless applications requiring high accuracy, compact packaging and low power consumption. They are developed with our patented SOI CMOS technology and operate optimally in cellular, Personal Communications Service (PCS) Global System for Mobile communications (GSM) basestations, and 2.4 GHz Wireless Local Area Network applications.

Honeywell digital attenuators are available in serial and parallel architectures, offer amazingly low insertion loss, and feature a unique combination of the low DC power consumption of a CMOS product with the attenuation accuracy and GHz frequency range of a GaAs product.

In addition to providing quality products, we offer support to ensure our devices work effectively as designed in your products. You receive the added benefit of our expertise in designing and developing ICs when you choose Honeywell as your supplier.

Visit [www.mysoiservices.com](http://www.mysoiservices.com) to receive more information about our products and list of sales representatives located near you. Order evaluation boards through our worldwide distributor, Richardson Electronics, at <http://www.rfpowernet.com>.

## Serial Digital Interface

With serial attenuators, our digital interface uses a simple clock and data shift register. Data in the shift register is isolated from the data latches during the shift operation. After the proper data has been shifted into the register, a rising edge on the OE line will load the value in the register into the latches, where it is held, defining the attenuation value, until the next load. All bits of the latch are loaded simultaneously.

## Parallel Digital Interface

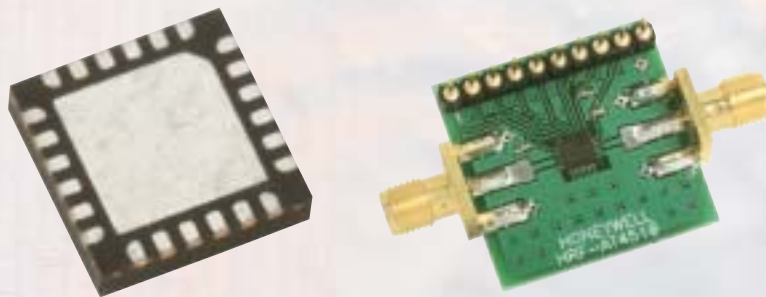
With parallel attenuators, our digital interface pins are buffered, ESD protected and level-shifted prior to presentation to the RF attenuator circuits. Buffering guarantees that isolation of the digital feed through and the required voltage levels are presented to the RF section. Based on the level applied to VSS, signals may be level shifted to increase the P1dB compression point.

## 15.5 dB, DC-4GHz, 5 Bit Parallel Digital Attenuator – HRF-AT4510

The Honeywell HRF-AT4510 is a 5-bit digital attenuator designed to operate optimally in broadband communication system applications. The HRF-AT4510, developed with Honeywell's patented SOI CMOS technology, is DC coupled, operates to 4 GHz and has world-class step accuracy.

### Features

- Very low DC power consumption
- Attenuation in steps from 0.5 dB to 15.5 dB
- Insertion loss of 2.0 dB at 2 GHz
- Single or dual power supply voltages
- Parallel data interface
- 50 Ohm compatible impedance
- Space saving LPCC™ surface mount packaging



Package Photo and HRF-AT4510 Eval Board

The Honeywell **HRF-AT4511** offers a serial interface and same level of high performance features as the HRF-AT4510.

## 31 dB, DC-4GHz 5 Bit Parallel Digital Attenuator – HRF-AT4520

The Honeywell HRF-AT4520 is a 5-bit digital attenuator ideal for use in broadband communication system applications that require high accuracy, speed and low power consumption. The HRF-AT4520, developed with Honeywell's patented SOI CMOS technology, operates at a frequency range of true DC to 4 GHz and has excellent return loss characteristics.

### Features

- Very low DC power consumption
- Attenuation in steps from 1 dB To 31 dB
- Attenuation accuracy of .22 dB +3% of IL at 2 GHz
- Single or dual power supply voltages
- Parallel data interface
- 50 Ohm compatible impedance
- Space saving LPCC™ surface mount packaging



Package Photo and HRF-AT4520 Eval Board

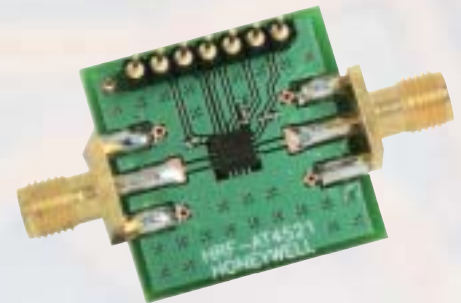
The Honeywell **HRF-AT4521** offers a serial interface and same level of high performance features as the HRF-AT4520.

## 31 dB, DC-1.5 GHz, 5 Bit Parallel Digital Attenuator – HRF-AT4522

The Honeywell HRF-AT4522 is a 5-bit digital attenuator ideal for use in cable communication system applications that require high accuracy, speed and low power consumption. The HRF-AT4522, developed with Honeywell's patented SOI CMOS technology, is DC coupled, operates to 2 GHz and matched to a 75 Ohm system.

### Features

- Very low DC power consumption
- Attenuation in steps from 1 dB To 31 dB
- Attenuation accuracy of .22 dB +3% of IL at 2 GHz
- Single or dual power supply voltages
- Parallel data interface
- 75 Ohm compatible impedance
- Space saving LPCC™ surface mount packaging

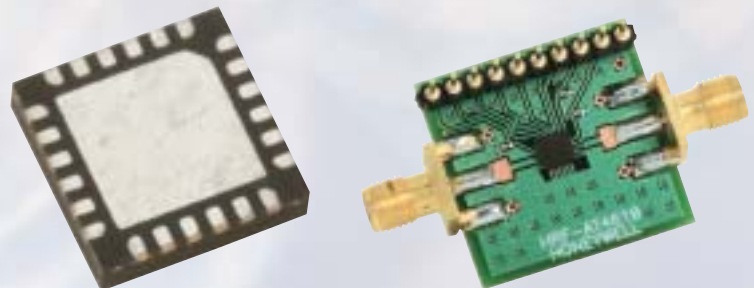


## 31.5 dB, DC-4GHz, 6 Bit Parallel Digital Attenuator – HRF-AT4610

The Honeywell HRF-AT4610 is a high accuracy 6-bit digital attenuator ideal for use in broadband communication system applications that require accuracy, speed and low power consumption. Along with low insertion loss, the HRF-AT4610 offers extremely high accuracy. The HRF-AT4610, developed with Honeywell's patented SOI CMOS technology, operates at a frequency range of DC to 4 GHz.

### Features

- Very low DC power consumption
- Insertion loss of 2.9 dB at 2 GHz
- Attenuation in steps from 0.5 dB To 31.5 dB
- Attenuation accuracy of .22 dB +3% of IL at 2 GHz
- Single or dual power supply voltages
- Parallel data interface
- 50 Ohm compatible impedance
- Space saving LPCC™ surface mount packaging



Package Photo and HRF-AT4610 Eval Board

The Honeywell **HRF-AT4611** offers a serial interface and same level of high performance features as the HRF-AT4610.

## Customized Services To Provide Added Benefits

We know that flexibility is what you need in the fast-paced telecommunications industry. Our customized services offer tailored options to meet your needs, from design to delivery.

### My SOI Foundry Services

Honeywell's My SOI Foundry is a complete foundry solution for all your RFIC manufacturing needs. We have been a flexible foundry leader for a variety of markets for over 20 years and are equipped to develop your state-of-the-art ICs using our proven Silicon On Insulator (SOI) technology, responsive service and advanced foundry experience.

Our ISO 9001 certified, on shore, 150mm wafer fab uses the latest six sigma based process controls to ensure your products are developed the way you designed them.

See the Honeywell My SOI Foundry brochure for more on how our capabilities and SOI CMOS technology can generate innovative results for your future designs.

### My SOI Design Services

With Honeywell design services, we offer detailed design support from a dedicated, experienced microwave designer or design team with over 20 years experience in developing IC solutions. Our design services enable fast creation of custom RFIC designs tailored from the world's leading process technologies.

Whatever your needs – co-development, conversion or transfer – our team of designers are highly experienced with architectures, designs and production of wireless systems and products. We offer flexibility and adaptability to ensure your products match the market, performance and speed needed today.

We can accomplish your design needs with our expertise in SOI, CMOS, GaAS RF and Mixed Signal Design, and constantly seek ways to help our customers reach the market as swiftly and cost-efficiently as possible.

### My SOI Test Services

To consistently ensure our high standard of quality wafers, Honeywell conducts thorough standard testing as well as customized test services, from PM testing of wafers to DC and RF characterizations of package components. We utilize onshore as well as offshore test facilities to provide DC and RF production testing.

### My SOI Packaging Services

You have a variety of options available with My SOI Packaging to ensure you're able to meet and deliver products that delight your customers. We guarantee high quality, fast delivery and custom packaging for large volume or limited production needs. By partnering with the highest quality high-volume packaging companies, we deliver customized packaging — from wafer thinning, backside gold and solder bumping — that provides the flexibility and quality you can rely on.

# Honeywell

The unlimited  
**partnership**



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